Babesiosis *(Babesia spp.)*

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1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Babesiosis is caused by microscopic parasites (protozoa) of the genus *Babesia*. The species responsible for disease in humans in the United States is a rodent strain *B. microti* and its close relatives.

B. Clinical Description and Laboratory Diagnosis

Many of the clinical features of babesiosis resemble malaria, including loss of appetite, fatigue, and a fever as high as 104ºF may be recurrent. Patients also report chills, sweats, muscle and joint pain, and nausea. The protozoa infect red blood cells and eventually destroy them, leading to anemia, a swollen liver and an enlarged spleen. For most patients, recovery is spontaneous and the illness is relatively mild. In endemic areas cases are often asymptomatic. However, the clinical course of babesiosis is worse among asplenic individuals, patients with a dysfunctional spleen, immunocompromised, or over the age of 60. Coinfections with the infectious agent of Lyme disease or other pathogens carried by ticks may complicate the clinical picture and lead to a more serious illness.

Laboratory diagnosis is made by identification of parasite within the red blood cells on blood smear, demonstration of specific antibodies by immunofluorescence assay or babesial DNA by polymerase chain reaction (PCR), and isolation of parasite in laboratory animals.

C. Vectors and Reservoirs

The primary vectors for babesiosis are *Ixodes* ticks, a distinct genus from the larger and better-known American dog tick (*Dermacentor variabilis*). In New Jersey, the prominent vector is *I. scapularis*, black legged or the deer tick. This is the same tick that carries and transmits the agents of Lyme disease and human granulocytic ehrlichiosis (see chapters on these other diseases). Ticks acquire the protozoa that cause babesiosis during their larval stage by feeding on infected animals, particularly the white-footed mouse. During its next (nymphal) stage, the tick poses the greatest threat of transmitting infectious organisms to animals and humans. Nymphs are most abundant between May and July, and they are typically found in wooded environments. Towards the end of summer through fall, nymphs mature to the adult stage. Although adult ticks remain capable of transmitting *B. microti* to humans, they are less likely to do so.

D. Modes of Transmission

Babesiosis is acquired from a tick bite. However, bites from *I. scapularis* are often painless and may occur on parts of the body that are difficult to observe, so patients may have no known history of a tick bite. Since *I. scapularis* also transmits *Borrelia burgdorferi*, the bacterium that causes Lyme disease, as well as the agent of human granulocytic ehrlichiosis, coinfection is possible. Under rare circumstances babesiosis is transmitted by blood transfusion.

E. Incubation Period

The incubation period ranges from 1 to 8 weeks, although occasionally it can be longer.

F. Period of Communicability or Infectious Period

With the exception of direct blood transfusion, babesiosis is not communicable from person-to-person. Any person with history of babesiosis should be excluded permanently from blood donation.

G. Epidemiology

The incidence of babesiosis is associated with the density of infected tick vectors and their animal hosts. As with Lyme disease, most cases of babesiosis arise during the summer and early fall. Cases have been reported in eight states, including New Jersey, Massachusetts, Rhode Island, Connecticut and New York. In year 2000, 15 cases of babesiosis were reported to NJDHSS.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

CASE CLASSIFICATION

A. CONFIRMED

- Identification of parasite within the RBCs on a thin or thick blood smear, **OR**
- Identification of specific antibodies against *Babesia spp*. and/or babesial DNA in clinically compatible case.

B. PROBABLE

Not used.

C. POSSIBLE

Not used.

Note: See Section 3 C below for information on how to report.

B. Laboratory Testing Services Available

Public Health and Environmental Laboratories (PHEL) perform examination of Giemsa or Wright-stained blood smears. Multiple thick and thin smears may be necessary to identify the parasite. Serological assays for anti-*Babesia* antibodies are becoming more common, although as of this writing have not been standardized. Laboratory serological testing for babesiosis is not available on site at the PHEL. At present, the PHEL will forward specimens to the Centers for Disease Control and Prevention (CDC) for serological testing for babesiosis. For additional information on submitting samples, contact the PHEL at 609.292.7368.

Note: The PHEL provides services for tick identification.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify the prevalence of babesiosis in New Jersey.
- To identify where babesiosis occurs in New Jersey.
- To recognize areas in New Jersey where babesiosis incidence has increased or decreased.
- To focus preventive education.
- To target tick control measures.

B. Laboratory and Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that laboratories report (by telephone, confidential fax, over the Internet using the Communicable Disease Reporting System (CDRS) or in writing) all cases of babesiosis to the local health officer having jurisdiction over the locality in which the patient lives,

or, if unknown, to the health officer in whose jurisdiction the health care provider requesting the laboratory examination is located.

C. Health Officer's Reporting and Follow-up Responsibilities

1. **Reporting Requirements**
   The New Jersey Administrative Code (N.J.A.C. 8:57-1.8) stipulates that each local health officer must report the occurrence of any case of babesiosis, as defined by the reporting criteria in Section 2A above. Current requirements are that cases be reported to the NJDHSS Infectious and Zoonotic Diseases Program using Babesiosis Report Form or CDS-1 form , or the report can be filed electronically over the Internet using the confidential and secure Communicable Disease Reporting System (CDRS).

2. **Case Investigation**
   a. It is the local health officer's responsibility to complete CDS-1 or Babesiosis Report Form by interviewing the patient and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the patient's healthcare provider or the medical record.
   b. Use the following guidelines in completing the form:
      1) Accurately record the demographic information, occupation, whether hospitalized (including location and associated dates), date of symptom onset, symptoms, laboratory information, treatment information, healthcare provider information, and outcome of disease (*e.g.*, recovered, died).
      2) Exposure history: use the incubation period range for babesiosis (one to 8 weeks). Specifically, focus on the period beginning a minimum of 1 week prior to the case's onset date back to no more than 8 weeks before onset date for the following exposures:
         a) Tick bite history: determine if the patient was bitten by a tick. If yes, ask and record information about the duration of tick attachment, date(s) and geographic location(s) where he/she was bitten.
         b) Travel history: determine the geographic area(s) visited by the patient, including known areas of high risk, such as Connecticut or Massachusetts.
         c) Pet/animal exposure: determine if the patient owns a pet or otherwise had contact with dogs, cats, or other animals.
      3) If the patient was diagnosed at the same time with another tick-borne disease, such as Lyme disease, ehrlichiosis, or Rocky Mountain spotted fever, please refer to other chapters of this manual and complete the appropriate forms.
      4) If there have been several unsuccessful attempts to obtain patient information, (*e.g.*, the patient or healthcare provider does not return calls or respond to a letter, or the patient refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as possible. Please note on the form the reason why it could not be filled out completely. **When using CDRS to report, enter collected clinical information into the "Comments" section.**

         After completing the form and attaching lab results it should be mailed (in an envelope marked "Confidential") to the NJDHSS, Infectious and Zoonotic Diseases Program, or the report can be filed electronically over the Internet using the confidential and secure Communicable Disease Reporting System (CDRS). The mailing address is:

         NJDHSS
         Division of Epidemiology, Environmental and Occupational Health
         Infectious and Zoonotic Diseases Program
         P.O.Box 369
         Trenton, NJ 08625-0369

c. Institution of disease control measures is an integral part of case investigation. It is the local health officer's responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4C, "Controlling Further Spread."

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (N.J.A.C. 8:57-1.10)

Minimum Period of Isolation of Patient
No restrictions except **permanent exclusion from blood donation**.

Minimum Period of Quarantine of Contacts
No restrictions.

B. Protection of Contacts of a Case

None.

Note: As mentioned in Section 1F, babesiosis is not communicable from person-to-person (with the exception of direct blood transfusion).

C. Managing Special Situations

None.

D. Preventive Measures

Environmental Measures
To prevent babesiosis, advise residents to make their yard less attractive to ticks through:

- Removal leaf litter and brush from around your home.
- Pruning low-lying bushes to let in more sunlight.
- Mowing lawns regularly.
- Keeping woodpiles in sunny areas, off the ground.
- If they are going to use acaracides around their home, advise them always follow the label instructions and never use near streams or other bodies of water.
- Making sure that any plants near home are not varieties that attract deer.
- Cleaning up the ground around bird feeders.

Personal Preventive Measures/Education
The best preventive measure is to avoid tick-infested areas. In areas where contact with ticks may occur, individuals should be advised of the following:

- Wearing long-sleeved shirts and long, light-colored pants tucked into socks or boots.
- Staying on trails when walking or hiking and try to avoid high grass areas.
- Using insect repellents properly. Repellants that contain DEET (diethyltoluamide) should be used in concentrations no higher than 15% for children and 30% for adults. Remember that repellents should *never* be used on infants. Permethrin is a repellent that can only be applied onto clothing, *not* exposed skin.
- After each day spent in tick-infested areas, checking yourself, children, and pets for ticks. Parts of the body ticks like most include the back of the knee, armpit, scalp, groin, and back of the neck. Promptly remove any attached tick using fine-point tweezers. The tick should not be squeezed or twisted, but grasped close to the skin and pulled straight out with steady pressure.

ADDITIONAL INFORMATION

A *Babesiosis Fact Sheet* can be obtained at the NJDHSS website (WEB link).

There is currently no formal CDC surveillance case definition for babesiosis. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. For reporting a case to the NJDHSS always refer to the criteria in Section 2 A of this chapter.

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